

## STUDY OF MORPHOLOGICAL AND PHYTOCHEMICAL ANALYSIS OF SOME MEDICINAL PLANTS OF TALOD-TALUKA, NORTH GUJARAT, INDIA



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### ABSTRACT

This study was undertaken with the aim of analyzing some morphological parameters and screening of important phytochemical compounds. Most probably herbal plants used in traditional medicinal consist of wide range of bioactive compounds that can be used as alternative therapeutic tools for the prevention or treatment of many contagious diseases. Phytochemicals have two categories i.e. Primary and secondary constituents. Primary constituents have chlorophyll, proteins, sugars, amino acids. Secondary constituents contain

Terpenoids and Alkaloids. Medicinal plants have anti-fungal, anti-bacterial and anti-inflammation activities. The present study involves five different medicinal plants *Mangifera indica*, *Madhuka indica*, *Manilkara zapota*, *Manilkara hexandra*, *Annona squamosa* available in Talod Taluka. Morphological assessment of five plants showed significant difference in leaf and flower attributes including its color and length in fresh form. The aqueous extract of leaf sample was used for the phytochemical constituents in plants. The result of the phytochemical analysis of these medicinal plant showed that the terpenoids, phlobatanins, reducing sugars, flavonoids and alkaloids were found to be present in afore mentioned plants.

## INTRODUCTION

Since the past decades, plants have been proven to be a crucial foundation of medicine. Even the days, up to 75 to 80% people around the world dependable on herbal remedies. Medicinal herbs constitute an effective source of traditional and modern medicine. Many herbal remedies individually or in combination have been recommended in curing different diseases. The medicinal plants are useful for healing as well as curing of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoids, alkaloids and phenolic compounds. Terpenoids exhibit various important pharmacological activities i.e. anti-inflammatory, anti-cancer, anti-malarial and anti-bacterial activities. Alkaloids are used as anesthetic agents and found in medicinal plants.

*Mangifera indica* Linn. The plant of Anacardiaceae family. Leaves contain alkaloids used as medicinal agent for their analgesic effect. The bear rosette of evergreen leaves and dense panicle reddish or yellowish flowers. *Madhuka indica* J.F.Gmel. Commonly known as butter tree which belongs to family Sapotaceae. The leaves are used in treatment of eczema. Leaves are evergreen or semi-evergreen. The flowers are pale yellow and sweet in taste from which alcohol is prepared. *Manilkara zapota* (L.) van Royen in. the plant commonly known as sapodilla from family Sapotaceae. Compound extracted from leaves showed anti-diabetic, anti-oxidant and hypocholesterolenic effect in rats. The ornamental leaves are green and

glossy. The white flowers are inconspicuous and bell-like with six lobed corolla. *Manilkara hexandra* (Roxb.) Dub. Is commonly known as Rayan from Sapotaceae family. Leaves extract used in anti-fungal activity and chicken pox, ringworm and headache. Leaves simple, alternate, glabrous, and elliptic and flower bisexual, white, 1-2 axillary. *Annona squamosa* L. plant commonly known as custard apple belongs to family Annonaceae. Leaves are used as poultice over boils, ulcer and having antic-microbial activity. Smelling leaves are deciduous, alternate, oblong or harrow-lanceolate. Flowers in drooping clusters, fragrant and greenish-yellow colored. The main objective of our research work was to analyze the presence or absence of different phytochemicals in the selected five medicinal plants from Talod Taluka used for curing of various diseases.

## MATERIAL AND METHODS

**Plant material :-** The present study included plan species which were *Mangifera indica*, *Madhuka indica*, *Manilkara zapota*, *Manilkara hexandra*, *Annona squamosa*.

### Chemicals

Fehling solution A and Fehling solution B, ethanol, distilled water, aqueous HCl, chloroform, conc. Sulphuric acid, Ammonia solution, picric acid, Hexane.

### Sample collection

Five medicinal plants were collected locally from the farm land of Talod Taluka. The plants were used for the purpose of their phytochemical analysis. The plants collected were identified botanically in botany department of science college, Talod. Fresh and tender leaves of selected plants were used for phytochemical analysis. Plant species selected during present investigation were given in Table 1.

Sr.No	Plant species	Local name	Part used
1	<i>Mangifera indica</i>	Mango	Leaves
2	<i>Madhuka indica</i>	Mahudo	Leaves
3	<i>Manilkara zapota</i>	Chiku	Leaves
4	<i>Manilkara hexandra</i>	Rayan	Leaves
5	<i>Annona squamosa</i>	Sitafal	Leaves

**Table-1:** Ethnobotanical information of selected medicinal plant species for phytochemical analysis in area of Talod taluka.

### **Preparation of plant extract**

The leaves of the selected plants were removed from the plants and then washed under running tap water to remove dust. The plant samples were then air dried for few days and the leaves were crushed into powder and stored in polythene bags for use. The plant powder was taken in a test tube and distilled water was added to it such that plant powder soaked in it and shaken well. The solution then filtered with the help of filter paper and filtered extract of the selected plant samples were taken and used for further phytochemical analysis.

### **Test for phlobatanins**

Plant powder sample was mixed with distilled water in a test tube, then shake it well, and filtered to take plant extract. Then to each plant extract, 1% aqueous hydrochloric acid was added and each plant sample was then boiled with the help of Hot plate stirrer. Formation of red colored precipitate confirmed a positive result.

### **Test for reducing sugar**

An amount of 0.50 g of selected plant sample was added in 5 ml of distilled water. Then 1 ml of ethanol mixed in plant extract. After that we took 1 ml of Fehling solution A and 1ml of Fehling solution B in a test tube, heated it to boiling and then poured it in the aqueous ethanol extract. When color reaction was observed, it shows appositve result.

### **Test for terpenoids**

An amount of 0.8 g of selected plant sample was taken in a test tube, then poured 10 ml of methanol in it, shaken well and filtered to take 5 ml extract of plant sample. Then 2 ml of chloroform were mixed in extract of selected plant sample and 3 ml of sulphuric acid were added in selected sample extract. Formation of reddish brown color indicates the presence of terpenoids in the selected plants.

### **Test for flavonoids**

For the conformation of flavonoids in the selected plants, 0.5 g of each selected plant extract were added in a test tube and 10 ml of distill water, 5 ml of dilute ammonia solution were added to a portion of the aqueous filtrate of each plant extract followed by addition of 1 ml conc. Sulphuric acid. Indication of yellow color shows the presence of flavonoids in each extract.

### Test for alkaloids

For the purpose of phytochemical analysis of the selected plants, 0.2 g of the selected plant sample was added in each test tube and 3 ml of hexane were mixed in it, shake well and filtered. Then took 5 ml of 2% HCl and poured in a test tube having the mixture of plant extract and hexane. Heated the test tube having the mixture, filtered it and poured few drop of picric acid in a mixture. Formation of yellow color precipitate indicates the presence of alkaloids.

### OBSERVATIONS

The morphological assessment showed that the leaves of all the plant green in color, length and width of leaves of the all the plants are different. All the plant having different flower, color and fruit type. Three plant like *Madhuka indica*, *Manilkara zapota* and *Manilkara hexandra* from sapotaceae family but having different morphological features. (Table 2) The qualitative phytochemical analysis indicated the presence of Phlobatanins, Reducing sugar, Terpenoids, Flavonoids, and Alkaloids in aqueous extract. The result of the phytochemical analysis shows that the five plants are rich in at least one Alkaloids, Flavonoids, Terpenoids, Reducing sugar and Phlobatanins. Plant *Manilkara zapota* having all these phytochemicals. The phytochemical screening and qualitative estimation of five medicinal plant showed that the leaves were rich in Phlobatanins, Reducing sugar, Terpenoids, Flavonoids and Alkaloids. (Table 3)

Phlobatanins are present in only one plant *Manilkara zapota*. Phlobatanins have been reported for its wound healing properties; these are anti-inflammatory, analgesic and anti-oxidant. Reducing sugar is present only in two plants out of five plants i.e., *Mangifera indica* and *Manilkara zapota*. Terpenoids are present in *Mangifera indica*, *Madhuka indica*, *Manilkara zapota* and *Manilkara hexandra*. Terpenoids are reported to have anti-inflammatory, anti-viral, anti-malarial, inhibition of cholesterol synthesis and anti-bacterial activity. Flavonoids are found in *Madhuka indica*, *Manilkara zapota* and *Manilkara hexandra*. Alkaloids are present in all the investigated plants. Plants having alkaloids are used in medicines for reducing headache and fever. These are attributed for anti-bacterial and analgesic properties.

Sr.No	Plant species	Leaf length(cm)	Leaf width(cm)	Petiol length(cm)	Flower color	Fruit type
1	<i>Mangifera indica</i>	16.5	4.4	2.3	Pinkish	Drupe
2	<i>Madhuka indica</i>	18.3	10.3	2.5	Creamy white	–
3	<i>Manilkara zapota</i>	10.6	3.1	1.6	Dull white	Berry
4	<i>Manilkara hexandra</i>	14.0	6.3	2.2	Creamy white	Berry
5	<i>Annona squamosa</i>	14.0	5.3	1.5	Greenish yellow	Compound

**Table: 2** Morphological parameters of selected medicinal plants.

+ = indicates the presence of phytochemical and

Sr.No	Plant species	Phlobatanins	Reducing sugar	Terpenoids	Flavonoids	Alkaloids
1	<i>Mangifera indica</i>	–	+	+	–	+
2	<i>Madhuka indica</i>	–	–	+	+	+
3	<i>Manilkara zapota</i>	–	–	+	+	+
4	<i>Manilkara hexandra</i>	+	+	+	+	+
5	<i>Annona squamosa</i>	–	–	–	–	+

- = Indicates the absence of phytochemical.

**Table: 3** Preliminary phytochemical analysis of screened medicinal plants.

## DISCUSSION & CONCLUSION

The present study examined the morphological attributes and presence of some important phytochemical in five selected medicinal plants. In our studies it was investigated that Terpenoids, Reducing sugar and Alkaloid are present in *Mangifera indica* but Phlobatannins and Flavonoids are absent. In previous study it was reported that Flavonoids are present in

aqueous extract of the *Mangifera indica*. The recent research studies and previous research studies result were different so it might be due to the change in location and genetic variation due to cross pollination and that is why it shows the different result. Reducing sugar and trace amount of alkaloids were found to be present in *Madhuka indica* according to previous study. While in present investigation Terpenoids, Flavonoids and Alkaloids were more in concentration as compared to other phytochemicals in this plant. In *Manilkara hexandra* Terpenoids, Flavonoids and Alkaloids are present. In our recent research studies Terpenoids, Flavonoids, Alkaloids and Reducing sugar were present in *Manilkara zapota*. While the previous research studies showed that Phlobatannins is absent. In recent studies only Alkaloids present in *Annona squamosa* and other four phytochemicals are absent. The study revealed the presence of important phytochemical in leaf extract of selected five medicinal plants. Mostly plants play a major role in traditional medicinal system to combat several diseases. Generally plants have many phytochemicals like Alkaloids, Flavonoids, Reducing sugar, Phlobatanins and Terpenoids with specialized properties. Medicinal plants are used for discovering and screening of the phytochemical constituents which are very helpful for the manufacturing of new drug for treatment of various diseases. This study justifies the use of plant species in medicinal field.

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